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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/679,605	10/01/2003	Alan R. Arthur	200311576-1	5929

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EXAMINER	
ALEJANDRO, RAYMOND	
ART UNIT	**PAPER NUMBER**
1745	

DATE MAILED: 07/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

8

Office Action Summary	**Application No.** 10/679,605	**Applicant(s)** ARTHUR, ALAN R.
	Examiner Raymond Alejandro	**Art Unit** 1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 July 2006*.
2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-57* is/are pending in the application.
  4a) Of the above claim(s) *5,31 and 40-57* is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-4,6-30 and 32-39* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☒ The drawing(s) filed on *01 October 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.
  Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
  Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  a)☐ All b)☐ Some * c)☐ None of:
    1.☐ Certified copies of the priority documents have been received.
    2.☐ Certified copies of the priority documents have been received in Application No. _____.
    3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
  * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/01/03, 04/11/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group I and Species 1 (Claims 1-4, 6-30 and 32-39) in the reply filed on 07/19/06 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Information Disclosure Statement

2. The information disclosure statements (IDS) submitted on 10/01/03 and 04/11/05 were considered by the examiner.

Drawings

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "350" has been used to designate both "the exhaust screen" and "the catalytic exhaust". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "620" has been used to designate both "the transverse member" and "the excess return air cathode tower". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 4, 7-9, 12, 14-15, 19-30 and 32-39 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. Claim 4 recites the limitation "*said air profiling manifold*" in line 1. There is insufficient antecedent basis for this limitation in the claim.

8. Claims 7-9, 12, 14-15, 19, 21, 34, 36 and 38 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See

MPEP § 2172.01. The omitted structural cooperative relationships are: the limitations "distal" or "proximal" fail to specifically provide structural relationship, thereby rendering the claim indefinite. In the absence of a specific structural orientation allowing to further define a specific reference point of a structure, it is contended that such limitations "distal" or "proximal" are relative terms which do not provide a standard for ascertaining the requisite structural characteristics intended by the applicant. That is, any element is a distal element with respect to a part, and same said element is also a proximal element with respect to another part.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. (*At least*) Claim 1 and 19 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Peterson 2004/0157096.

The present application is directed to an integrated fuel cell stack and catalytic combustor apparatus wherein the disclosed inventive concept comprises the specific integration of a combustor with a fuel cell stack.

Peterson disclose a solid oxide fuel cell (SOFC) with a double envelope design; wherein the modular thermal management package provides power supplied by incorporating two electrode connectors 11 which connect the envelope 10 for supplying power to external devices

(P0031). Peterson uncovers that catalytic combustor 20 can be integrated directly into the SOFC 14 exhaust section to burn residual fuel (P0031 & 0050). It is mentioned that SOFC can have a modular stack configuration with interconnection (P0007). The double envelope design includes envelope 10, a layer 16 and an inner envelope 17 (P0032). *The double envelope design represents the claimed frame.*

It is also mentioned the presence of an ignitable catalytic combustor (P0016) and an electrical igniter connector (*the wire*) (P0018) or a catalytic combustor 20 which is ignited by a heater coil adjacent thereto (P0051); and a plurality of connectors to receive and supply electric power (P0012). *It is noted that SOFC (and any fuel cell) inherently includes a cathode, an anode and an electrolyte; that the disclosed catalytic combustor must include a catalytic bed to burn the residual fuel.*

Figures 2 and 4 below illustrate the integrated SOFC 14 and catalytic combustor 20:

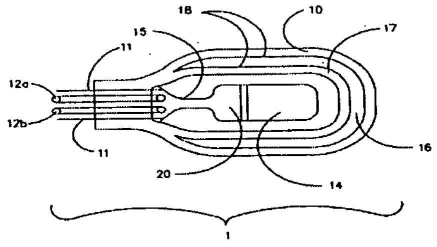


FIGURE 2

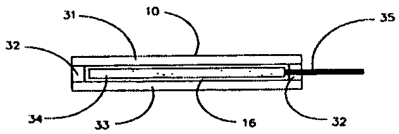


FIGURE 4a

Ipso facto, Peterson anticipates at least claims 1 and 19.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 1-4, 6-7, 9-30, 32-33 and 35-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Domeracki et al 5413879 in view Peterson 2004/0157096.

The present application is directed to an integrated fuel cell stack and catalytic combustor apparatus wherein the disclosed inventive concept comprises the specific integration of a combustor with a fuel cell stack.

As to claims 1, 19-20, 25:

Domeracki et al disclose an integrated solid oxide fuel cell system (TITLE/ABSTRACT). The solid oxide fuel cell generator comprises a plurality of tubular solid oxide fuel cells (COL 1, lines 12-17) and is comprised of one or more modules (COL 3, lines 26-32). Solid oxide fuel cell 50 comprises a porous air electrode; a fuel electrode; and an electrolyte (COL 3, lines 40-48).

Particularly, **Figure 3** below depicts a housing 13 that encloses an inlet air manifold 52, an exhaust plenum combustion chamber 7, a reaction chamber 57 and an inlet fuel manifold 53. It is apparent from **Figure 3** the formation of a cavity in a housing (the frame) in which combustion chamber 7 is at least partially disposed. Reference numeral 45, spent fuel, implies the formation of a fuel flow channel defined between the fuel cell 50 and combustion chamber 7. Either or both reference numeral 23 and its associated distribution passage and/or exhaust pipe 59 may represent the excess cathode air router. Housing enclosing the fuel cell 50 and combustion chamber 7 comprises an upper member (upper end), a lower member (lower end); and various transverse members such as plates 54, 55, or 56 which interconnects respective designated upper and lower members.

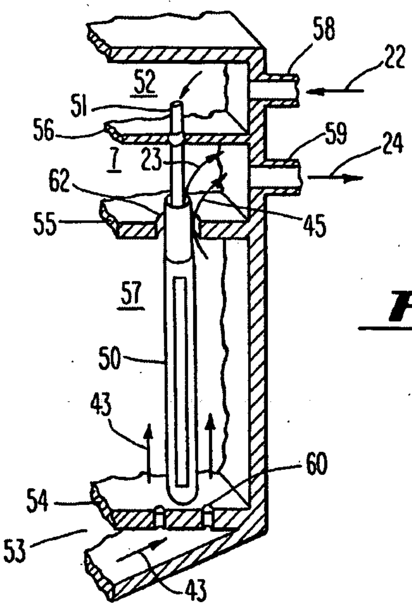


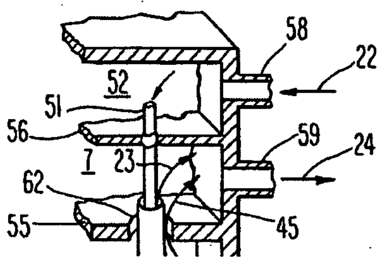
Fig. 3

As to claim 2:

Reference numeral 45, spent fuel, implies the formation of a fuel flow channel defined between the fuel cell 50 and combustion chamber 7.

As to claims 3-4, 6, 9, 22-23, 29-30 and 32-33:

Illustrated and disclosed is an inlet air manifold 52 (COL 3, lines 26-39). Enlarged portion of **Figure 3** illustrates an inlet pipe 58, heated air 22, air supply tube 51. Either or both reference numeral 23 and its associated distribution passage and/or exhaust pipe 59 may represent the excess cathode air router . *This configuration meets the claimed requirement of having outer and inner skins as no further structural characteristic is required. All of these components are in fluid communication or fluidly coupled to allow introduction of air; and fluid communication between the cathode air flow line and combustion chamber 7.*



As to claim 7 and 21:

Enlarged portion of Figure 3 below also illustrates heated fuel 43 flowing into the fuel cell arrangement through area 53, plate 54, thereafter through plate 55 and exhaust pipe 59. *It is contended that both the fuel manifold and the oxidant manifold are coupled either proximal or distal of the fuel cell stack assembly. See also item 8 above for clarification.*

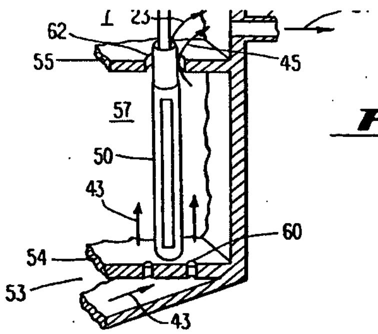
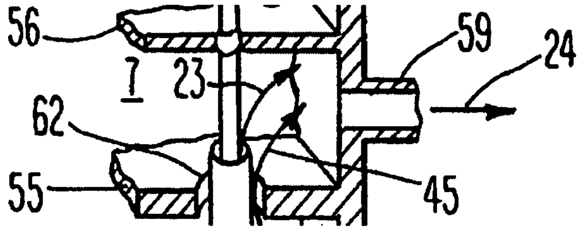


Fig. 3

As to claims 10-12 and 15:

Walls including plates 55, 56 surrounding combusting chamber 7 represent a shell structure enclosing such a chamber. Passage allowing spent fuel 45 coming into chamber 7 and exhaust pipe 59 are both pass-through holes; and they also serve as the catalytic flow channels located at respective distal and proximal ends thereof.



As to claims 16-18 and 28:

Domeracki et al disclose a solid oxide fuel cell system (TITLE/ABSTRACT/COL 1, lines 12-17). Solid oxide fuel cell 50 comprises a porous air electrode and is made of strontium-doped lanthanum manganite; and a fuel electrode; and an electrolyte (COL 3, lines 40-48). *The porous air electrode is made of a ceramic material and represents the porous substrate. They disposed along an interior of the fuel cell arrangement.*

Domeracki et al disclose a solid oxide fuel cell as seen and described above. However, the preceding prior art fails to expressly disclose the catalytic combustor including the specific catalytic bed and the specific catalytic igniter; the specific profile of the catalytic bed; and the specific current collection-power stack collector assembly.

With respect to claims 1, 13-14, 19, 24-26, 35-36:

Peterson disclose a solid oxide fuel cell (SOFC) with a double envelope design (P0031). Peterson uncovers that catalytic combustor 20 can be integrated directly into the SOFC 14 exhaust section to burn residual fuel (P0031 & 0050). It is mentioned that SOFC can have a modular stack configuration with interconnection (P0007). The double envelope design includes envelope 10, a layer 16 and an inner envelope 17 (P0032) wherein layer 16 may be a ceramic material (P0030). *The double envelope design represents the claimed frame.*

It is also mentioned the presence of an ignitable catalytic combustor (P0016) and an electrical igniter connector (*the wire*) (P0018) or a catalytic combustor 20 which is ignited by a heater coil adjacent thereto (P0051). *It is noted that SOFC (and any fuel cell) inherently includes a cathode, an anode and an electrolyte; that the disclosed catalytic combustor must include a catalytic bed to burn the residual fuel.*

Figures 2 and 4 below illustrate the integrated SOFC 14 and catalytic combustor 20:

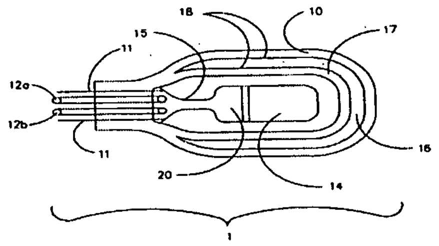


FIGURE 2

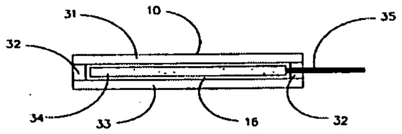


FIGURE 4a

As to claim 27:

It is noted that the frame inherently acts as ground to complete electrical routing.

As to claims 37-39:

Peterson disclose a solid oxide fuel cell (SOFC) with a double envelope design wherein the modular thermal management package provides power supplied by incorporating two electrode connectors 11 which connect the envelope 10 for supplying power to external devices (P0031); and a plurality of connectors to receive and supply electric power (P0012).

In light of these disclosures, it would have been obvious to a person possessing a level of ordinary skill in the field of the invention to use the catalytic combustor including the specific catalytic bed and the specific catalytic igniter of Peterson in the fuel cell system of Domeracki et al because Peterson disclose that such specific catalytic combustor is integrated directly into the SOFC to burn residual fuel (P0031) so that the combustion of residual fuel permits to recover thermal energy to provide high performance and efficiency of the system (P0018).

With respect to the specific profile of the catalytic bed, it would have been obvious to a person possessing a level of ordinary skill in the field of the invention to employ the specific profile of the catalytic bed as instantly claimed or any amount of catalytic therein as Peterson discloses that the catalytic combustor (thereby, the catalyst included therein) burns residual unreacted fuel to enhance thermal energy recovery to increase performance and efficiency; thus, Peterson recognizes the catalytic combustor (thereby, the catalyst included therein) as a variable that achieves a recognized result *(i.e. amount of catalyst material sufficient to burn unreacted residual fuel to enhance thermal energy recovery and thereby, performance and efficiency) In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)*. See also *Peterson, 315 F.3d at 1330, 65 USPQ2d at 1382*; and *In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969)*. Generally speaking, differences in concentration will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re*

Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Thus, it is prima-facie obvious to choose or select a desirable amount/concentration profile of catalytic material. ***See MPEP 2144.05 Obviousness of Ranges.***

As far as the specific current collection-power stack collector assembly, it would have been obvious to a person possessing a level of ordinary skill in the field of the invention to use the specific current collection-power stack collector assembly of Peterson in the fuel cell system of Domeracki et al as Peterson discloses that a current collection-power stack collector assembly allows to connect the specific power generating fuel cell to external devices to supply the generated power. Thus, such assembly provides the electrical connection necessary to distribute the generated electric power.

14. Claims 8 and 34 rejected under 35 U.S.C. 103(a) as being unpatentable over Domeracki et al 5413879 in view Peterson 2004/0157096 as applied to claims 7 and 33 above, and further in view of Senner 2002/0102445.

Domeracki et al and Peterson are both applied, argued and incorporated herein for the reasons expressed above. However, none of the preceding references expressly disclose the specific flame arrestor.

Senner describes fuel cells (P0003), the integration of a catalytic combustor with a fuel cell system (P0007); and the use of a flame arrestor in the front of a combustor (P0041).

In light of these disclosures, it would have been obvious to a person possessing a level of ordinary skill in the field of the invention to use the specific flame arrestor of Senner in the fuel cell system of Domeracki et al and Peterson as Senner discloses the suitability of using a flame arrestor in the front of a combustor to assist in preventing flame entering or diffusing into the fuel cell system.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Raymond Alejandro
Primary Examiner
Art Unit 1745

RAYMOND ALEJANDRO
PRIMARY EXAMINER